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(54) Title: DETOXIFYING FOOD SUPPLEMENT

(57) Abstract

A food additive which has the effect of ameliorating the effects of the ingestion of alcoholic beverages includes the combination of any one or more sugars from the group consisting of zylitol, D(+) galactose, D(+) lactose, D(+) xylose, dulcitol, wyo-inositol, L(-) fructose, D(-) mannitol, sorbitol, D(+) glucose, D(+) arabinose, D(-) arabinose, cellobiose, D(+) maltose, D(+) raffinose, L(+) rhamnose, D(+) melibiose, D(-) ribose, adonitol, D(+) arabitol, L(-) arabitol, D(+) fucose, L(-) fucose, D(-) lyxose, L(+) lyxose, and L(-) lyxose, and any one or more amino acids from the group consisting of arginine, glutamine, lysine, asparagine, aspartic acid, cysteine, glutamic acid, glycine, histidine, leucine, methionine, phenylamine, proline, serine, threonine, tryptophan, tyrosine, valine, and taurine in a quantity such that for each measure of the sugar between 2.5 and 6 grams there is a cumulative amount of amino acid which falls within the effective range of at least one of the amino acids in the combination where the effective range in the case of arginine, asparagine, aspartic acid, cysteine, glutamic acid, serine, glycine, histidine, leucine, methionine, phenylalanine, proline, valine, glutamine, lysine, and taurine is from 25 to 50 milligrams; and, in the case of threonine, tryptophan, and tyrosine, is from 25 to 1500 milligrams. To accelerate the volatilization process, acetic acid or acetylsalicylic acid, or both, is added.

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DETOXIFYING FOOD SUPPLEMENT

This invention relates to food supplements which have the effect of ameliorating the effects of the ingestion of alcoholic beverages.

Background

A search for a cure for morning after "hangovers" or for a substance to sober up a drunk is likely to lead to a multitude of home remedies. They range from "hair of the dog that bit you" to tomato juice to strong black coffee. The fact that some of these "cures" are often repeated and recommended by those who try them suggests that they do have some beneficial effect and that there is a human mechanism which, if activated, can diminish drunkenness and the discomfort that attends recovery from drunkenness. More methodical searches for sobering and antihangover substances have suggested that sugars and aspirin are useful. United States patent No. 3,584,122 suggests ingestion of 1000 milligrams of fructose to produce sobering in an hour. West German patent No. 2,321,113 appears to recommend a mixture of one-third ascorbic acid, one third D-glucose and one-third of a mixture of Japanese peppermint oil, eucalyptus oil, and aniseed oil as a sobering mixture but does not appear to quantify any result.

Summary of the Invention

One object of the invention is to provide a substance, a food supplement, which has a rapid sobering effect or which reduces post drunkenness discomfort or both.

Another object is to provide such a supplement, which is inexpensive to make and use, is readily manufactured and packaged, has long shelf life, and does not have a disagreeable taste.

Another object is to provide such a substance in a form which can be dissolved in readily-available liquids, fruit juice or plain water, so that it can be ingested by an alcohol drinker at the place where he or she has been drinking.

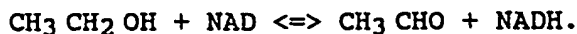
These and other objects and advantages of the invention which will hereinafter appear, are realized by the provision of a food supplement which converts the alcohol in the ingester's stomach into a different substance, which utilizes body chemistry to reduce blood alcohol to carbon dioxide and urea and which crosses the brain-blood barrier to restore neuro-receptor and neuro-transmitter equilibrium. We have discovered a material that provides those results. It detoxifies alcohol in the stomach and blood in thirty minutes or less, and it restores normal motor function and sensory functions in seconds after being ingested. The material that provides those actions is a combination of one or more of four "pure" sugars with one or more of a number of amino acids. The sugars are L-fructose, L-mannitol, L-sorbitol and D(+)glucose. The term "pure" as applied to sugar herein means crystalline purity, 99 percent pure. The requirement for high purity is based upon both a need for purity and the fact that the character of impurities is unknown and some can negate the

arabitol, D(+) fucose, L(-) fucose, D(-) lyxose, L(+) lyxose, and L(-) lyxose. The term "pure" as applied to sugar herein means crystalline purity, 99 percent pure. The requirement for high purity is based upon both a need for purity and the fact that the character of impurities is unknown and some can negate the effectiveness of the sugar or the amino acids. The amino acids are glutamine, lysine, arginine, asparagine, aspartic acid, cysteine, glutamic acid, glycine, histidine, leucine, methionine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine, valine, and taurine. The amino acids may be those found in common foodstuffs such as orange juice, clam chowder, soy bean soup, sheep milk, and others, but for uniform and more predictable result it is preferred that the amino acid be incorporated in pure crystalline form having optical density of 20 degrees or less.

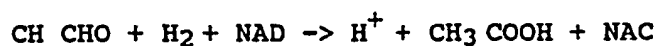
An excessive amount of any of the listed sugars can cause nausea, heat sensation, flushing, and ringing of the ears. The degree of drunkenness to be overcome and the amount required in the practice of the invention depends in part on the amount of alcohol that was ingested. There is a level of alcohol intake below which the drinker does not require the invention. In terms of amount of sugar, that level is about 2.5 grams. More than 6 grams of sugar may produce the adverse side effects listed above and is not required to produce the sobering effect. Thus the range of sugar per serving is about 2.5 to 6 grams. When prepackaged, 2.5 to 3 grams per package is preferred. A drinker who needs more than 3 grams, may be given two packages.

One function of the sugar is to react chemically with alcohol to change it to harmless form. The chemistry and metabolic process involved in that action has been the subject of much study and several papers on the subject are listed in the bibliography below. It appears that the metabolism of alcohol is accelerated by the addition of a quantity of acetic acid

or acetylsalicylic acid to the basic combination of sugar and amino acid. For example, acetylsalicylic acid induces the production of the enzymes which convert ethanol to acetaldehyde by stimulating production of alcohol dehydrogenase in the liver in the volatilization reaction:



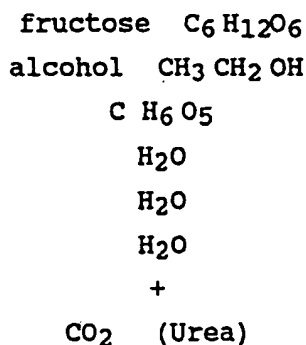
The acetaldehyde is converted to acetic acid by the stimulation of the enzyme acetaldehyde dehydrogenase.



The acetic acid is further converted to a (2) carbon metabolite (CO_2) by the enzyme carboxylase.



The addition of the acetylsalicylic acid apparently produces, by conjugation, an abundance of carboxylase to accelerate conversion of the acetic acid to CO_2 . However, the invention is not concerned with the specifics of the process and relies only on the fact that alcohol in the blood and stomach can be eliminated as a consequence of ingestion of the ingredients of the inventive supplement. The reaction with alcohol which has not left the stomach is described as follows, using fructose as the example:



One function of the amino acid, apparently in consort with the sugar because excessive sugar produces the side effects mentioned above, is to overcome the effect of astrocyte cells and to permit the amino acid to dissolve in the lipids that form part of the endothelial cells of capillaries in the brain. In any event, the amino acids are able to cross the blood-brain barrier and to enter the brain, just as alcohol does, where they nullify the effect of alcohol. The specifics of that process are unknown but are sometimes characterized as restoring equilibrium to the neuro-receptors and neurotransmitters.

The amino acids listed above have been found to be effective in combination with the listed sugars. Amino acids not in that list have not been found to be effective. In terms of quantity required for effectiveness with sugar in the range 2.5 to 6 grams, the amino acids arginine, tryptophan and tyrosine have been found to be effective in the range 25 to 3000 milligrams. The others appear to be effective in the range from 25 to 50 milligrams. The three amino acids which are effective over the greatest range: arginine, tryptophan, and tyrosine, are preferred over the other amino acids. The smaller number represents the minimum amount for reasonable effectiveness, and the upper amount represents the quantity above which the desired effect tends not to be increased. There appears to be no bar, except that the total may be too much or too little, to combining the amino acids that appear in the list above. On the other hand, to add others of the amino acids or other substances may have the effect of frustrating the invention. For example, orange juice, tomato juice, grapefruit juice, apple juice, lemon juice, milk, chicken broth, beef broth, clam and fish soup,

high protein powder, and soybean soup all contain amino acids found in the list above. However, grapefruit juice, apple juice, and tomato juice have too little amino acid and tend to nullify or minimize the effectiveness of the invention.

Description of the Preferred Embodiment

In the broad sense, the preferred form of the invention is a combination of any one or more of the listed sugars and any one or more of the listed amino acids in a quantity such that for each measure of the sugar between 2.5 and 6 grams there is an accumulation of effective amounts to a total of about 480 milligrams or more.

In a more specific sense, it is now preferred that the sugar and amino acid combination be provided in powdered rather than in capsule or pill form to minimize the possibility of choking by an inebriated user. Also, it is preferred to incorporate something to flavor the mixture and enhance its palatability. That can be done by adding one or both of an artificial flavoring material and a dried and powdered fruit in crystalline or solid form which has a desired flavor and, in addition, serves as a source of amino acid. Orange and lemon solids or crystals are examples.

No upper limit to the permissible amount of amino acid has been found. However: because of recommendations by medical authorities that persons with certain kinds of ailments avoid ingesting massive doses of amino acid; because among the liquids which are sometimes recommended for medicinal use, sheep milk at 8000 milligrams per cup (240 cc) has the highest amino acid content; and further, because it is recommended according to the invention to ingest the materials of the invention with approximately one cup (240 cc) of water or fruit juice; it is considered that the upper limit of amino acid to be combined with 6 or less grams of the sugar is 8000 milligrams.

The quantity above which additional quantities of amino acids have no effect when combined with 2.5 to 6 grams of sugar is between 2000 and 3000 milligrams. The lower limit for observable beneficial result is very low, five to ten milligrams of amino acid. However, tests indicate that at least 480 milligrams is required to insure restoration of motor and sensory functions to very inebriated subjects. On that basis the preferred range of ingredients is 2.5 to 6 grams of pure form of one or more of the sugars listed above together with 480 to 3000 milligrams of pure, or foodstuff form, of one or more of the amino acids listed above. Within the list of amino acids, arginine, tryptophan, and tyrosine are preferred.

Examples

Example 1. The combination of 3 grams of pure sugar selected from, or consisting of a combination of sugars from, the group consisting of zylitol, D(+) galactose, D(+) lactose, D(+) xylose, dulcitol, wyo-insoitol, L(-) fructose, D(-) mannitol, sorbitol, D(+) glucose, D(+) arabinose, D(-) arabinose, cellobiose, D(+) maltose, D(+) raffinose, L(+) rhamnose, D(+) melibiose, D(-) ribose, adonitol, D(+) arabitol, L(-) arabitol, D(+) fucose, L(-) fucose, D(-) lyxose, L(+) lyxose, and L(-) lyxose with 480 to 3000 milligrams of pure, crystalline amino acid consisting of any combination of, or any one of, the group of amino acids consisting of glutamine, lysine, arginine, asparagine, aspartic acid, cysteine, glutamic acid, glycine, histidine, leucine, methionine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine, valine, and taurine.

Example 2. The combination of 3 grams of pure sugar selected from, or consisting of a combination of sugars from, the group consisting of zylitol, D(+) galactose, D(+) lactose, D(+) xylose, dulcitol, wyo-insoitol, L(-) fructose, D(-) mannitol,

sorbitol, D(+) glucose, D(+) arabinose, D(-) arabinose, cellobiose, D(+) maltose, D(+) raffinose, L(+) rhamnose, D(+) melibiose, D(-) ribose, adonitol, D(+) arabitol, L(-) arabitol, D(+) fucose, L(-) fucose, D(-) lyxose, L(+) lyxose, and L(-) lyxose with 480 to 3000 milligrams of pure, crystalline amino acid consisting of any combination of, or any one of, the group of amino acids consisting of arginine, tryptophan, and tyrosine.

Example 3. The combination of 3 grams of pure sugar selected from, or consisting of a combination of sugars from, the group consisting of zylitol, D(+) galactose, D(+) lactose, D(+) xylose, dulcitol, wyo-inositol, L(-) fructose, D(-) mannitol, sorbitol, D(+) glucose, D(+) arabinose, D(-) arabinose, cellobiose, D(+) maltose, D(+) raffinose, L(+) rhamnose, D(+) melibiose, D(-) ribose, adonitol, D(+) arabitol, L(-) arabitol, D(+) fucose, L(-) fucose, D(-) lyxose, L(+) lyxose, and L(-) lyxose with 480 to 1000 milligrams of pure, crystalline amino acid consisting of any combination of, or any one of, the group of amino acids consisting of arginine, tryptophan, tyrosine, and a quantity of an amino acid containing foodstuff in dry solid or in crystalline form containing no more than 7000 milligrams of amino acid.

Example 4. The combination of 3 grams of pure sugar selected from, or consisting of a combination of sugars from, the group consisting of zylitol, D(+) galactose, D(+) lactose, D(+) xylose, dulcitol, wyo-inositol, L(-) fructose, D(-) mannitol, sorbitol, D(+) glucose, D(+) arabinose, D(-) arabinose, cellobiose, D(+) maltose, D(+) raffinose, L(+) rhamnose, D(+) melibiose, D(-) ribose, adonitol, D(+) arabitol, L(-) arabitol, D(+) fucose, L(-) fucose, D(-) lyxose, L(+) lyxose, and L(-) lyxose with a quantity of an amino acid containing foodstuff in dry solid or in crystalline form containing no more than 8000 milligrams of one or more of the amino acids in the group consisting of glutamine, lysine, arginine,

asparagine, aspartic acid, cysteine, glutamic acid, glycine, histidine, leucine, methionine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine, valine, and taurine.

Restoration of motor and sensory functions is so rapid that no acceleration is needed. If it is desired to accelerate the metabolism of alcohol, acetylsalicylic acid is added at the rate of about three to six grains for each 2.5 to 3 grams of sugar. Also, the addition of acetylsalicylic acid has the added advantage that the resulting mixture also helps overcome the discomfort that is often experienced while overcoming alcohol intoxication. The addition of the acetylsalicylic acid to the basic mixture of the invention results in a product which is useful as a remedy for the after effects of alcohol intoxication even if ingested after the ingester is no longer intoxicated.

In this modification of the basic recipe, three to six grains of acetylsalicylic acid is added for each 2.5 grams of sugar up to a maximum of 12 grains of the acid. Again, all or a part of the amino acid may be added in the form of a fruit juice or other foodstuff which is rich in one or more of the operative amino acids.

Citric acid is an alternative to acetylsalicylic acid as a potentiator of the volatilization of alcohol. The minimum amount for effectiveness is about ten percent by weight of the amount of sugar. The inclusion of citric acid rather than acetylsalicylic acid has the advantage that the upper permissible limit is established by taste rather than by some deleterious effect.

Acetylsalicylic acid and citric acid may be combined such that the product includes an amount of acetylsalicylic acid which equals approximately 0.025 to 0.06 grains for each

milligram in which the amount of acetic acid is less than 100
milligrams per gram of sugar.

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The Claims

We claim:

1. The combination of any one or more pure sugars from the group consisting of zylitol, D(+) galactose, D(+) lactose, D(+) xylose, dulcitol, wyo-insoitol, L(-) fructose, D(-) mannitol, sorbitol, D(+) glucose, D(+) arabinose, D(-) arabinose, cellobiose, D(+) maltose, D(+) raffinose, L(+)rhamnose, D(+) melibiose, D(-) ribose, adonitol, D(+) arabitol, L(-) arabitol, D(+) fucose, L(-) fucose, D(-) lyxose, L(+) lyxose, and L(-) lyxose; and any one or more amino acids from the group consisting of arginine, asparagine, aspartic acid, cysteine, glutamic acid, glycine, histidine, leucine, methionine, phenylalanine, proline, serine, threonine, glutamine, lysine, tryptophan, tyrosine, valine, and taurine in a quantity such that for each measure of the sugar between 2.5 and 6 grams there is a cumulative amount of amino acid which is not less than 480 milligrams.

2. In combination:

sugar and amino acid in the proportions 2.5 to 3 grams of sugar from the group zylitol, D(+) galactose, D(+) lactose, D(+) xylose, dulcitol, wyo-insoitol, L(-) fructose, D(-) mannitol, sorbitol, D(+) glucose, D(+) arabinose, D(-) arabinose, cellobiose, D(+) maltose, D(+) raffinose, L(+)rhamnose, D(+) melibiose, D(-) ribose, adonitol, D(+) arabitol, L(-) arabitol, D(+) fucose, L(-) fucose, D(-) lyxose, L(+) lyxose, and L(-) lyxose and at least 480 milligrams of one or more of arginine, tryptophan, and tyrosine.

3. An article of manufacture comprising sugar and amino acid in the proportions 2.5 to 3 grams of sugar from the group zylitol, D(+) galactose, D(+) lactose, D(+) xylose, dulcitol, wyo-insoitol, L(-) fructose, D(-) mannitol, sorbitol, D(+) glucose, D(+) arabinose, D(-) arabinose, cellobiose, D(+) maltose, D(+) raffinose, L(+) rhamnose, D(+) melibiose, D(-) ribose, adonitol, D(+) arabitol, L(-) arabitol, D(+) fucose, L(-) fucose, D(-) lyxose, L(+) lyxose, and L(-) lyxose mixed and packaged as a dry powder with between 480 and 3000 milligrams of one or more of threonine, tryptophan, and tyrosine.

4. The invention defined in Claim 3 in which said article further comprises a quantity of edible flavoring and coloring material.

5. The invention defined in Claim 2 in which at least a portion of the amino acid is contained in a naturally occurring foodstuff.

6. The invention defined in Claim 1 which further comprises approximately three to six grains of acetylsalicylic acid for each 2.5 to 3 grams of sugar.

7. The invention defined in Claim 2 which further comprises approximately three to six grains of acetylsalicylic acid for each 2.5 to 3 grams of sugar.

8. The invention defined in Claim 3 which further comprises approximately three to six grains of acetylsalicylic acid for each 2.5 to 3 grams of sugar.

9. The method of ameliorating the effects of the ingestion of alcoholic beverages which method comprises ingesting the combination of any one or more sugars from the group consisting of zylitol, D(+) galactose, D(+) lactose, D(+) xylose, dulcitol, wyo-insoitol, L(-) fructose, D(-) mannitol, sorbitol, D(+) glucose, D(+) arabinose, D(-) arabinose, cellobiose, D(+) maltose, D(+) raffinose, L(+) rhamnose, D(+) melibiose, D(-) ribose, adonitol, D(+) arabitol, L(-) arabitol, D(+) fucose, L(-) fucose, D(-) lyxose, L(+) lyxose, and L(-) lyxose; and

any one or more amino acids from the group consisting of arginine, glutamine, lysine, asparagine, aspartic acid, cysteine, glutamic acid, glycine, histidine, leucine, methionine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine, valine, and taurine in a quantity such that for each measure of the sugar between 2.5 and 6 grams there is a cumulative amount of amino acid which falls within the effective range of at least one of the amino acids in the combination where the effective range in the case of arginine, asparagine, aspartic acid, cysteine, glutamic acid, glycine, histidine, leucine, methionine, phenylalanine, proline, servine, valine, and taurine is from 25 to 50 milligrams, and in the case of threonine, tryptophan, and tyrosine, is from 25 to 1500 milligrams.

10. The invention defined in Claim 9 in which the material to be ingested further comprises approximately three to six grains of acetylsalicylic acid for each 2.5 to 3 grams of sugar.

11. The invention defined in Claim 10 in which at least a portion of said amino acid is contained in a foodstuff.

12. The invention defined in Claim 1 which further comprises approximately one tenth gram of citric acid for each gram of sugar.

13. The invention defined in Claim 9 which further comprises approximately one tenth gram of citric acid for each gram of sugar.

14. The invention defined in Claim 1 which further comprises a quantity of acetic acid and an amount of acetylsalicylic acid which equals approximately 0.025 to 0.06 grains for each milligram in which the amount of acetic acid is less than 100 milligrams per gram of sugar.

15. The invention defined in Claim 11 which further comprises a quantity of acetic acid and an amount of acetylsalicylic acid which equals approximately 0.025 to 0.06 grains for each milligram in which the amount of acetic acid is less than 100 milligrams per gram of sugar.

INTERNATIONAL SEARCH REPORT

International Application No. PCT/US88/03591

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC		
IPC : A61K 31/195		
U.S. 514/23, 159,162, 474, 811, 823		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
U.S.	514/23, 159, 162, 474, 811, 823	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹		
Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
A	US, A, 4,115,572 (PAUL ET AL) 19 September 1978 (Abstract and columns 1-8).	1-15
A	US, A, 4,212,893 (TAKAHATA) 15 July 1980 (Abstract and columns 1-6)	1-15
A	US, A, 4,500,515 (LIBBY) 19 February 1985 (Abstract and columns 1-22)	1-15
A	US, A, 4,582,705 (PRIMES ET AL) 15 April 1986 (Abstract and columns 1-8)	1-15
X	US, A, 4,596,825 (SUDA ET AL) 24 June 1986 (Abstract and columns 1-8)	1-15
A	US, A, 4,647,453 (MEISNER) 03 March 1987 (Abstract and columns 1-14)	1-15
P,A	US, A, 4,753,804 (IACCHERI ET AL) 28 June 1988 (Abstract and columns 1-12).	1-15
<p>* Special categories of cited documents: ¹⁰</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p>		
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